

For Learning Purpose Only

%Question 1 part a

```
xmin = -20;  
xmax = 30;  
ymin = 0;  
ymax = 8;  
n=-20:30;  
t = 0:30;  
  
% Creating 31 impulses from n=0(origin) to n=30  
IMPulses = eye(31);  
  
% Initializing variable for Step Function.  
STEP = zeros(1,31);  
  
% (Now) Adding Impulses to create a step.  
for i=1:31  
    STEP = STEP + IMPulses(i,:);  
End  
  
stem(t,STEP);  
axis([xmin xmax ymin ymax])
```

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% Question No. 1 part b

```
xmin = -20;
xmax = 30;
ymin = 0;
ymax = 10;
n=-20:30;
t=0:30;

LENGth = input('Enter Desired Length : ');
x = round(10*rand(1,LENGth));

disp('Generated Impulses are : ');
disp(x);
display('Press any key to Continue');
pause

IMPulses = eye(31);
SIGnal = zeros(31);
DESiredSignal = zeros(1,31);

for i=1:LENGth
    SIGnal(i,:) = x(i)*IMPulses(i,:);
end

for j=2:31
    SIGnal(1,:) = SIGnal(1,:) + SIGnal(j,:);
end

DESiredSignal = SIGnal(1,:);

stem(t,DESiredSignal)
axis([xmin xmax ymin ymax])
```

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```
function OUTput = CONvolution1(x,y)

LENGth = length(x) + length(y) - 1 ;
DS = zeros(1,LENGth);
eDS = DS;

if(length(x)>length(y))
    Osmall = y;
    Olarge = x;
else
    Osmall = x;
    Olarge = y;
end

for j = 1:length(Osmall)
    DS(j:(length(Olarge)+j-1)) = Osmall(j)*Olarge;

    eDS(j:(length(Olarge)+j-1)) = eDS(j:(length(Olarge)+j-1)) +
        DS(j:(length(Olarge)+j-1));
end

OUTput = eDS;
```

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%Question 2 part b

```
h1 = 4*[0 0.5 0.25 0 0];
h2 = [1 0 0 0 -4 0];
h3 = [0 0 0 0 0 1 0];
h4 = h3;
h5 = h2;
h34 = CONvolution1(h3,h4);
h134 = CONvolution1(h1,h34);
h12 = CONvolution1(h1,h2);

##### this could be a function #####
if(length(h134)>length(h12))
    LENGTH = length(h134);
    PEL1 = (-1) * h134;
    PEL2 = h12;
    PEL1(1:length(PEL2)) = PEL1(1:length(PEL2)) + PEL2;
else
    LENGTH = length(h12);
    PEL1 = h12;
    PEL2 = (-1) * h134;
    PEL1(1:length(PEL2)) = PEL1(1:length(PEL2)) + PEL2;
end

h1234=PEL1;

##### this could be a function #####
if(length(h1234)>length(h5))
    PEL3 = h1234;
    PEL4 = h5;
    PEL3(1:length(PEL2)) = PEL1(1:length(PEL2)) + PEL2;
else
    PEL3 = h5;
    PEL4 = h1234;
    PEL3(1:length(PEL2)) = PEL1(1:length(PEL2)) + PEL2;
end

h12345=PEL3;

t = 0:(length(h12345)-1);

stem(t,h12345);
```

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% Question No. 3

```
phases1 = [(0) (pi/4) (pi/2) (3*pi/4) (pi)];  
amps1 = [0.5 0.6 0.7 0.8 0.9];  
freqs1 = [0.02 0.01 0.4 0.2 0.005];  
n = 0:.1:100;  
  
X = zeros(1,length(n));  
  
for i=1:5  
X = X + amps1(1,i)*(sin((freqs1(1,i)*n) + phases1(1,i)));  
end  
t = 0:(length(X)-1);  
plot(n,X);
```

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